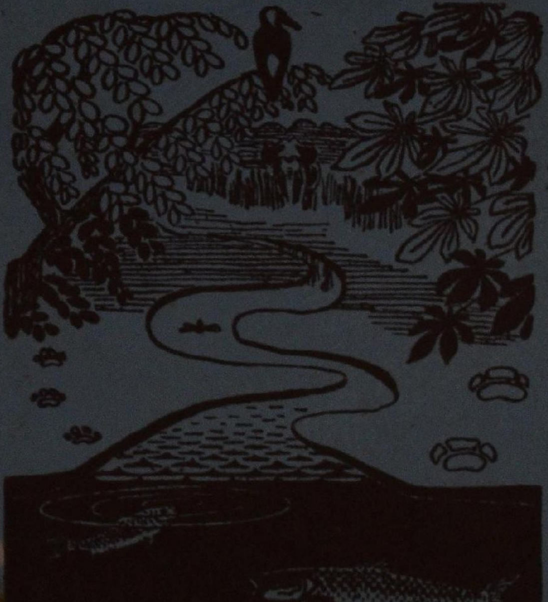
VOL. XXVI. AUGUST, 1953 NO. 2

JOURNAL OF THE BENGAL NATURAL HISTORY SOCIETY.



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Edited by : S. THOMAS SATYAMURTI, M.A., F.Z.S.

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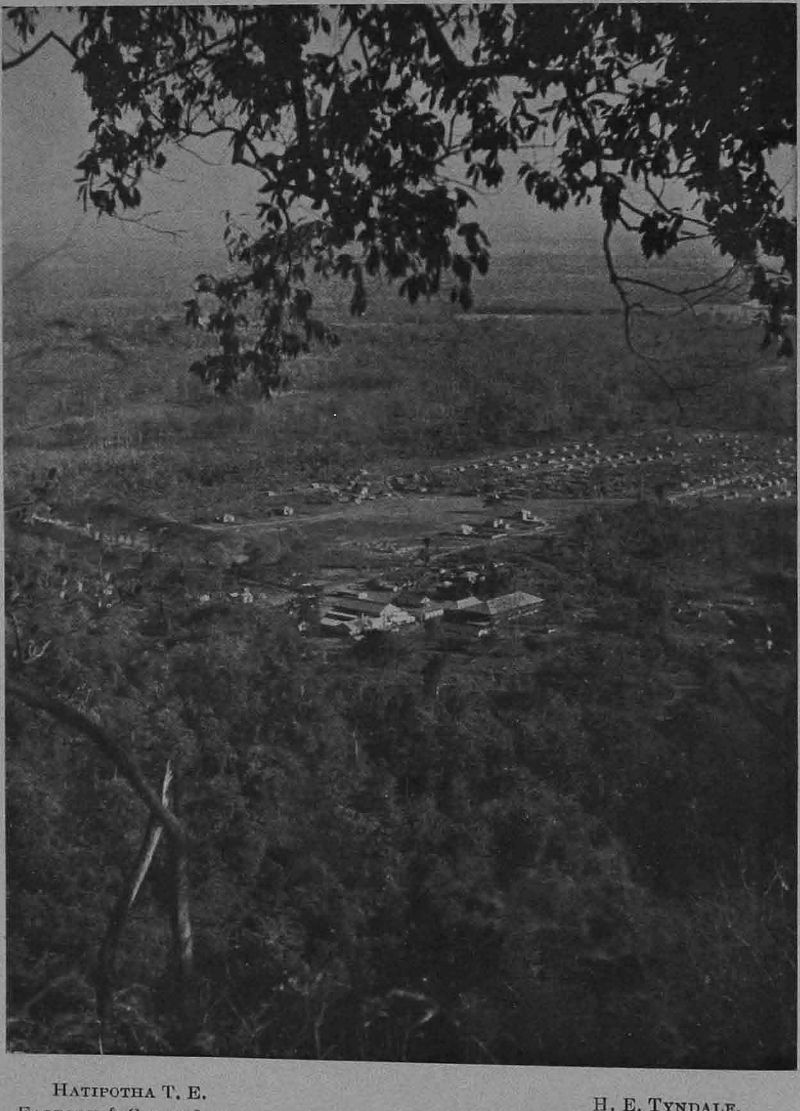

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JOURNAL

OF THE

BENGAL NATURAL HISTORY SOCIETY

VOL. XXVI. AUGUST, 1953. No. 2

BIRDS OF THE DUARS

By

C. M. INGLIS, F.Z.S., C.M.B.O.U.

(Continued from page 8, Vol. XXVI, No. 1)

Family *Timaliidae*.

Sub-family *Timaliinae*.

24. The Bengal Jungle Babbler.

Turdoides terricolor terricolor (Hodgson).

(Fauna Br. Ind. 2nd Ed., No. 178).

Description.—Length 10 inches. Sexes alike. Upper plumage earthy-brown of various tints ; tail brown, with cross rays and white tips; lower plumage fulvous, rather ashy on the chin and faintly barred ; sides of abdomen and below the tail tinged with brown.

Bill flesh-coloured, chrome yellow or dirty white ; iris white or yellowish-white ; legs yellowish-white or fleshy-yellow.

Generally known as the 'seven sisters'.

Distribution and habits.—This very familiar Babbler is common everywhere in the foothills and plains. It is one of the commonest garden birds, often seen hopping about, in long hops and turning over dead leaves, etc., underneath shrubs, in its hunt for insects, snails or worms. The whole time it keeps

up a constant babble or bursts into hysterical calls. This Babbler also frequents bushes in cultivated, or waste lands and is a very untidy looking bird, whose wings and tail appear to hang loosely as it hops about. Besides the above-mentioned articles of food it feeds largely on various figs and ber fruit, all picked up from the ground, and an occasional frog, spider and centipede. I have also seen it eat grain from animal droppings. It is a fearless bird and will rush to the assistance of any member of its party which is attacked by any other bird. Jungle Babblers also fight among themselves. Finn mentions a quarrel over a cockroach in which two birds were adherent to it, while a third devoured it, "as neither of the joint owners dared to let go its hold."

It breeds during most months of the year and the nest is an untidy cup, composed of roots, grass, leaves, etc., placed in any bush or tree. The number of eggs laid is, usually, four but I once took seven from one nest in Bihar. They are highly glossy, Hedge-sparrow blue in colour and measure about 1.01 by 0.78 inches. This Babbler is much parasatized by both the Brain-fever bird and the Pied Crested Cuckoo; the eggs of all these three very closely resemble each other.

25. The Striated Babbler.

Argya earlei (Blyth).

(Fauna Br. Ind. 2nd Ed,, No. 191).

Description.—Length 9½ inches. Sexes alike. Upper plumage brown, tinged with rufous, and streaked with very dark brown ; tail cross-rayed ; sides of head, and from chin to upper breast, rufescent, with dark streaks increasing in size downdards ; rest of lower plumage dingy brownish-fulvous. The tail is rather long and much graduated.

Distribution and habits.—Very common at Haldibari and Binaguri, also in the Torsa river-bed and is likely to be found elsewhere in the district where there is heavy grass and reed-jungle, especially near water. It is very gregarious and noisy and may be seen clambering about the reeds or hopping

about on the ground near them. It has the same weak flight as the Jungle Babbler and flies in the same follow-my-leader fashion. Its food consists mainly of insects.

It is sure to breed in the Duars, but the season varies a lot in different districts ; in some it is from March to June and in others from October to December and in Burma nests have been found in July. The nest is rather a massive, cup-shaped structure, made of grass, grass-roots or reed-leaves and fixed between reeds, or in some small shrub, surrounded by reeds and situated in high grass, reeds or rushes, seldom far from water ; in fact, some are actually in it. The eggs number 3 or 4 and are intensely glossy and deep blue-green in colour. They measure about 0.88 by 0.07 inches.

26. The Slender-billed Babbler.

Argya longirostris (Hodgson).

(Fauna Br. Ind. 2nd Ed., No. 197).

Description.—Length 10 inches. Sexes alike. Upper plumage deep rufous-brown ; chin, throat and centre of abdomen white ; rest of the lower plumage ferruginous.

Bill black ; iris white ; legs dark brown. As its name implies it has a slender bill.

Distribution and habits.—I have only secured a few specimens of this Babbler at Hasimara, in long grass where, according to O'Donel, it is a common species. It is gregarious like the other Babblers and keeps to long grass-reeds. It feeds both on the ground and in the reeds on various insects In all its habits it is like the last bird and its notes, mostly, as discordant as those of that bird.

27. The Himalayan Slaty-headed Scimitar Babbler.

Pomatorhinus schisticeps schisticeps Hodgson.

(Fauna Br. Ind. 2nd Ed., No. 199).

Description.—Length 10 inches. Sexes alike. Top of head dark slaty; upper plumage rufescent olive-brown; sides of head black with a broad white eyebrow from nostrils to

nape; a maroon-chestnut patch on the neck; lower plumage white with sides of breast and abdomen, maroon-chestnut, streaked with white below the neck; flanks and patch below the tail dusky olive-brown.

Bill pale dull yelow, base of upper mandible blackish; iris pale yellow or reddish-yellow; legs slaty.

The Scimitar Babblers are easily recognised by their Scimitar-shaped bills.

Distribution and habits.—The commonest Scimitar Babbler in the district, usually seen in small parties or pairs in the undergrowth of the forest or scrub jungle interspersed with grass both in the hills and the plains. It is rather a noisy bird but its notes are quite mellow and it searches for food both in the jungle and on the ground, turning over the dry leaves in true Babbler-like manner; its food consists of insects and grubs.

It breeds from the middle of March to June. I found a nest containing two fresh eggs in a small patch of elephant grass on the outskirts of the Rehti forest, near Binaguri, on the 15th March, 1938. It was cup-shaped, but loosely put together on the outside, and composed of coarse grass and leaves, lined with fine grass; it was placed on the ground. The number of eggs laid is 3 or 4, and like all eggs of this genus, they are pure white in colour. They measure about 1 by 0.73 inches.

28. The Western Coral-billed Scimitar Babbler.

Pomatorhinus ferruginiosus ferruginiosus (Blyth).

(Fauna Br. Ind. 2nd Ed., No. 210).

Description.—Length 9 inches. Sexes alike. Crown and sides of the head black; forehead rufous; a broad, white eyebrow extending to the nape; upper plumage olive-brown and lower bright ferruginous, except the chin and throat, which are white and the flanks olivaceous.

Bill deep coral-red ; iris yellow ; legs yellowish brown with a leaden tint.

Easily recognised by the colour of its bill.

Distribution and habits.—I have never come across this bird but O'Donel obtained it above Baksa Duar. It goes about in pairs, or small parties, keeping to forest or dense undergrowth. It feeds a lot on the ground and moves about on it in long hops like the Jungle Babbler ; its food is insectivorous. It is rather a silent bird but does, sometimes, utter a chorus of rather sweet notes.

29. The Sikkim Rusty-cheeked Scimitar Babbler.

Pomatorhinus erythrogenys haringtoni Stuart Baker.

(Fauna Br. Ind. 2nd. Ed., No 220)

Description.—Length 11 inches. Sexes alike. Upper plumage olive-brown ; forehead, sides of head and neck, flanks, thighs and patch under the tail chestnut ; chin to upper breast dark ashy with the white bases of the feathers of the former showing through ; there are some white streaks on the latter ; rest of lower plumage white.

Bill light horny, dark at base of upper mandible ; iris almost white ; legs fleshy-brown.

Distribution and habits.—This Scimitar Babbler occurs both in the hills and well into the plains. I obtained one at Baksa Duar on the 25th February, 1918, and O'Donel another at Gorumara on the 14th March, 1933. When seen it is usually in small parties but it is oftener heard than seen as it keeps so much to the undergrowth. I found it common in the latter round Baksa Duar. Stuart Baker tells us that "they indulge in the same conversational outbursts and quaint dances that their relations delight in." Its food consists of insects, grubs, worms, etc., and it has the same feeble flight as others of its genus.

It will, probably, be found breeding in the hills above Baksa Duar. The breeding season is May and June. Its nest is similar to that of other Scimitar-Babblers and situated in scrub jungle. The eggs number 2 to 4 and are pure white in colour. They measure about 1.11 by 0.8 inches.

30. The Bengal Red-capped Babbler.

Timalia pileata bengalensis Godwin-Austin.

(Fauna Br. Ind. 2nd Ed., No. 227).

Description.—Length 7 inches. Sexes alike. Forehead and a short eyebrow white ; crown chestnut-rufous ; front of the eye black; upper plumage olive-brown; lower plumage white as far as the breast, the latter with black shaft-lines and the sides grey; tail brown with cross-rays; rest of lower plumage fulvous.

Bill black ; iris bright red ; legs blackish or horny brown.

The chief characteristic of this Babbler is the rigidness of the shafts of the feathers of the forehead and crown.

Distribution and habits.—A plains species, very common in high grass and brushwood and usually seen in pairs which keep inside the cover but, sometimes, come to the tops of the grass only to drop down quickly into the cover again. It is also seen in parties and though not a noisy bird it has various notes and the members of the party call to each other continuously. Deignan, writing about the closely allied Burmese race, says its note "is a squealing *eek-eek-eek-eek-eek or wra-a-reek, eek-eek-eek-eek,* the notes descending the scale" ; he has also given the alarm note as *chink* and the one by which the various members of the party keep in touch with each other as a sharp *peek.* I have come across this bird at Rajabhatkhawa, Hasimara, Hantapara and Haldibari and no doubt it occurs elsewhere and is resident.

The breeding season, elsewhere, is from April to July. The nest is a roughly made domed ball-like nest, composed of coarse grass or shreds of the same, scantily lined with finer

grass and either placed on the ground under a bush or else in a bush a few inches above the ground, situated in scrub, grass-jungle or in a cane-brake. The eggs number 3 or 4, rarely 5 and are white marked with small blotches of dark umber-brown and a few underlying ones of inky grey. They measure about 0.71 by 0.58 inches.

31. The Sikkim White-headed Shrike-Babbler.

Gampsorhynchus rufulus rufulus Blyth.

(Fauna Br. Ind. 2nd Ed., No. 232).

Description.—Length 10 inches. In adults the head, neck and breast white ; upper plumage golden-brown and lower plumage, from the breast, pale fulvous. In the young the head, neck and breast are light chestnut.

Bill fleshy horn colour, darker at base and along the top of the upper mandible ; iris lemon-white ; legs reddish brown.

The tail is much graduated and the rictal bristles, near the gape, are very long.

Distribution and habits.—I have never seen this bird in the district but O'Donel said it was common in the foot-hills above 1000 feet elevation. It is fond of bamboo-jungle but also frequents grass-jungle interspersed with bushes and occasionally scrub. It is gregarious and noisy and not a shy bird and, apparently, never descends to the ground. When I was in Cachar these Shrike-Babblers used to frequent some bamboo-clumps near my bungalow.

32. The Bhutan Yellow-eyed Babbler.

Chrysomma sinense saturatior (Ticehurst).

(Fauna Br. Ind. 2nd Ed., No. 235).

Description.—Length 7 inches. Sexes alike. Upper plumage very dark brown ; a patch in front of the eye, a short eyebrow, chin and throat white ; rest of lower plumage pale fulvous.

Bill black, yellowish near nostrils; iris pale lemon-yellow, the eyelids deep orange; legs pale orange-yellow.

The tail is very long and graduated and the deep orange eyelids are a very conspicuous feature. The type specimen was obtained by one of Mandelli's collectors in the "Bhutan-Duars" in January, 1877.

Distribution and habits.—A very common little Babbler in grass lands all over the district and also in scrub jungle. It goes about singly, in pairs or small parties, clambering up and down the grass-stems, every now and then flirting its long tail and uttering its sweet note; it seldom descends to the ground.

Its usual breeding season is from June to August, but many breed as early as May. It makes a beautiful cup-shaped nest of grass and fibre, the outside covered with cobwebs and the inside lined with fine grass. The eggs usually 5 in number, are of three types; the commonest being yellowish or pink, densely marked with light red speckles and spots and sometimes, blotches; the second type is boldly blotched and smeared with the same colour or else a deeper brown with some neutral tint underlying marks; the third type has the ground colour white, with purplish brown blotches at the thick end. They measure about 0.73 by 0.59 inches.

33. The Assam Yellow-bellied or Hume's Yellow-bellied Babbler.

Chrysomma altirostris griseigularis (Hume).

(Fauna Br. Ind. 2nd Ed., No. 238).

Description.—Length 6½ inches. Sexes alike. Upper plumage reddish brown; chin, throat and upper breast grey; remainder of lower plumage dull rufous.

Bill pale horny, base of lower mandible whitish; iris brown, or golden brown; eyelids yellowish green; legs pale fleshy or orange brown.

The bill is pale horny instead of the black of the last species.

Distribution and habits.—Recorded from the "Bhutan Duars" where Mandelli's collectors are said to have obtained it. Neither O'Donel nor myself, have ever come across it. Stuart Baker writes, "It is found always in pairs and always in grass of some kind though this may be anything from two to twenty feet high. It has a sweet little song of some dozen notes or so which it sings from the highest piece of grass near its nest."

34. The Assam, or Mandelli's Spotted Babbler.

Pellorneum ruficeps mandellii Blanford.

(Fauna Br. Ind. 2nd Ed., No. 243).

Description.—Length 6 inches. Sexes alike. Forehead to nape and sides of head, rufous, the latter margined with a dusky line; feathers of the hind neck and sides of neck blackish on the outer webs and cream colour on the inner ones; upper plumage olive-brown ; a white eyebrow, with feathers tipped with black; lower plumage fulvous, boldly streaked with blackish brown on the breast and flanks.

Bill: upper mandible horny brown, lower horny white; iris reddish brown; legs fleshy white.

Distribution and habits.—A very common resident bird in forest, scrub jungle or bamboos where it is very partial to the undergrowth. It goes about in pairs or small parties, feeding on the ground. It is more often heard than seen, but if one remains quiet it can be seen turning over leaves on the ground just as the well known jungle Babbler, or Seven Sisters, does. These parties keep up a continual chatter and if disturbed, vanish into the undergrowth. It is mainly insectivorous. The notes of this Babbler are, usually, pleasant and musical, the one most often heard sounds like *pretty dear, pretty dear ;* it also has some harsh ones, such as *Kraa,* which are uttered when alarmed.

The breeding season is from March to May. I found a nest in the Rehti forest on the 28th March, 1938; it was situated on the ground, amongst dead leaves and raised against a clod in *Marungi.* The nest is a round mass of grass-stems or leaves, very loosely built and with a few roots as lining. Some nests are cup-shaped and others semi-domed and are situated in scrub jungle, thin forest, bamboo jungle or just inside ekra or sungrass. The eggs number 3 or 4, exceptionally 5; the nest I found contained 3 fresh eggs. The ground colour is usually white, but it may be tinged with buff or grey; the eggs are profusely marked with specks and blotches of various shades of brown, with underlying blotches of pale lavender; the spots are more numerous, and often larger, at the broad end forming a cap, or ring, there. They measure about 0.88 by 0.65 inches.

(To be continued)

FIELD NOTES ON THE BIRDS OF THE KOLHAN FOREST DIVISION

(Singhbhum District, Bihar)

By

JAMAL ARA

(Continued from page 20, Vol. XXVI, No. 1)

ORDER CORACIIFORMES

Family *Picidae*

89. **Picus vittatus.**—The Scaly-Bellied Green Woodpecker: In forests on the banks of a stream in Patung. Resident.

90. **Leiopicus mahrattensis.**—The Yellow-fronted Pied Woodpecker: Common and resident throughout the Division, but avoids heavy forests.

91. **Dryobates nanus.**—The Pigmy Woodpecker: Seen at Saitba throughout the year, but at Goilkera only during the rains.

92. Micropternus brachyurus.—The Rufous Woodpecker: Only at Luia, 3 or 4 birds seen together. Very noisy.

93. Brachypternus benghalense.—The Golden-backed Woodpecker: A very common resident.

Family *Capitonidae*

94. Thereiceryx zeylanicus.—The Green Barbet: Rare, only seen in Leda 3 near Goilkera where it is resident.

95. Xantholaema haemacephala.—The Crimson-Breasted Barbet: A very common resident.

Family *Cuculidae*

96. Cuculus micropternus.—The Indian Cuckoo: Only at Luia and Rajabassa where it was very common. The call can be syllablised as *Utho-dekho.*

97. Hierococcyx varius.—The Common Hawk-Cuckoo: Common and resident throughout the Division but never seen or heard at Chaibassa though it occurs in the forests only some 8 miles away.

98. Surniculus lugubris.—The Drongo Cuckoo: Only at Patung in the hot weather. Not in large numbers.

99. Clamator jacobinus.—The Pied Crested Cuckoo: Seen throughout the year in forests near Saitba, and nowhere else. Mostly singly, and once a pair.

100. Eudynamis scolopaceus.—The Koel: Common at Goilkera and seen once at Bamiaburu. Only a few birds seemed to be present at Goilkera in the winter but became fairly common in the hot weather.

101. Rhopodytes tristis.—The Large Green-billed Malkoha: A pair at Patung seen both in the cold and hot weathers. It is very shy and takes cover in dense foliage on the slightest suspicion. Never heard calling.

102. Centropus sinensis.—The Crow-Pheasant. Common and resident throughout the Division.

Family *Psittacidae*

103. Psittacula eupatria.—The Large Indian Parakeet : Resident and common throughout the Division.

104. Psittacula krameri.—The Rose-ringed Parakeet: Resident and common throughout the Division but less so than the last one.

105. Psittacula cyanocephala.—The Blossom-headed Parakeet: More numerous than the Rose-ringed one.

Family *Coraciidae*

106. Coracias benghalensis.—The Indian Roller: Resident and common throughout the Division.

Family *Meropidae*

107. Merops orientalis.- The Common Green Bee-eater: Common and resident throughout the Division.

108. Merops superciliosus.—The Blue-tailed Bee eater: Common and resident at Goilkera, Chaibassa and Luia.

109. Merops leschenaulti.—The Chestnut-headed Bee-eater: Frequently seen at Saitba, Chaibassa and Luia. Appears to wander about.

Family *Alcedinidae*

110. Ceryle rudis.—The Pied Kingfisher: Seen only at Saitba and Luia, where also it is not very common.

111. Alcedo atthis.—The Common Kingfisher: Common and resident at Saitba, Bamiaburu, Luia and Khajuria. More common than the last bird.

112. Halcyon smyrnensis.— The White-breasted Kingfisher : Seen only at Luia in a patch of evergreen forest. Rare. Singly.

Family *Bucerotidae*

113. **Dichoceros bicornis.**—The Great Hornbill: A pair seen several times in evergreen forest at Luia. It is difficult to account for its presence here. It was observed in April, 1948, but only two birds were seen. No flocks were ever observed even though according to Stuart Baker these birds are gregarious. It was identified mainly by its great size and the presence of one broad white bar in each wing and a double casque. The noise while flying was so great as to startle one.

114. **Anthracoceros coronatus.**—The Malabar Pied Hornbill: Common and resident at Kendbai and Paral near Goilkera, Bamiaburu, Rajabassa, Patung and Luia, but always in the forests.

115. **Anthracoceros malabaricus.**—The Large Indian Pied Hornbill: Seen in the same localities as the last bird.

116. **Lophoceros birostries.**—The Common Grey Hornbill : Common and resident throughout the Division, including places away from the forests.

Family *Upapidae*

117. **Upapa epops.**—The Hoopoe: Rare. One seen at Barkhela and a second one at Khajuria.

Family *Micropidae*

118. **Micropus affinis.**—The House Swift: Seen at Saitba only during the rains.

119. **Cypsiurus parvus.**—The Palm-Swift: Numerous on the few palms at Chaibassa, and a few seen at Goilkera, though there was no palm tree near about.

Family *Caprimulgidae*

120. **Caprimulgus macrourus.**—The Long-tailed Nightjar: Common throughout the Division. The call was only heard in the hot weather, and it is difficult to say whether the bird stays on during the cold weather or not.

121. Caprimulgus indicus.—The Jungle Nightjar: Common at Bamiaburu, Rajabassa and Goilkera.

122. Caprimulgus monticolus.—Franklin's Nightjar: Heard in the forested areas.

123. Caprimulgus asiaticus.—The Common Indian Nightjar: Common throughout the Division.

Family *Tytonidae*

124. Tyto alba.—The Indian Barn Owl: Observed at Chaibassa and Saitba only. Would appear to be an irregular visitor. On all its appearances it was mobbed by House Crows, as also small boys who went after it with catapults for the sake of its oil.

Family *Asionidae*

125. Huhua nipalensis.—The Forest Eagle-Owl: Only one bird seen on the top of Horarangaburu near Barkhela, at an elevation of 2,700 feet.

126. Athene brama.—The Spotted Owlet: A very common resident throughout the Division.

127. Athene blewitti.—The Forest Spotted Owlet: Seen only once at Goilkera in secondary jungle.

128. Glaucidium radiatum.—The Jungle Owlet: Seen only at Bamiaburu.

ORDER ACCIPITRES.

Family *Pandionidae.*

129. Pandion haliaetus.—The Osprey: Only one seen on a pond in cultivated fields at Barkhela, in winter.

Family *Aegypiidae.*

130. Sarcogyps calvus.— The Pondicherry Vulture: Common and resident in the open country at Chaibassa, Goilkera and Barkhela.

131. **Pseudogyps bengalensis.**—The Indian White-backed Vulture : Common and resident in the open country at Jhilruan, Goilkera, Barkhela and Chaibassa.

132. **Neophron percnopterus.**—The Scavenger Vulture : Commonly seen at Goilkera and Chaibassa.

Family *Falconidae.*

133. **Falco chiquera.**—The Red-headed Merlin : Often seen at Chaibassa and Saitba and twice at Bamiaburu. Rather rare.

134. **Cerchneis tinnunculus.**—The Kestrel : A winter visitor to Chaibassa and Saitba.

135. **Aquila rapax.**—The Tawny Eagle : Seen at Saitba during the rains.

136. **Circaetus gallicus.**—The Short-Toed Eagle : At Saitba only.

137. **Spilornis cheela.**—The Crested Serpent Eagle : Rather rare. Only observed at Saitba during the rains.

138. **Haliaetus leucoryphus.**—Pallas's Fishing Eagle : Common at Chaibassa during the rains.

139. **Haliastur indus.**—The Brahminy Kite : Common throughout the Division during the rains.

140. **Milvus migrans.**—The Common Pariah Kite : Very common and resident throughout the Division, but rare at Bamiaburu, where it was seen only in the hot weather. The race *Milvus migrans lineatus* was also observed during the winter of 1947. It was identified by a white patch on the underside of the wings, which is conspicuous in flight.

141. **Elanus caeruleus.**—The Black-Winged Kite : Frequently seen in the well wooded areas of the Division in the cold weather.

142. **Circus macrourus.**—The Pale Harrier : Frequent at Chaibassa, once at Bamiaburu in the winter, where raptores are generally scarce.

143. **Astur badius.**—The Shikra: Frequently seen at Chaibassa.

ORDER COLUMBAE.

Family *Columbidae.*

144. **Crocopus phoenicopterus.**—The Green Pigeon : Common and resident at Patung, Saitba and Goilkera.

145. **Dendrophassa bicincta.**—The Orange-breasted Green Pigeon. Rather rare. Only observed at Luia and Goilkera.

146. **Columba livia.**—The Blue Rock-Pigeon : A very common resident throughout the Division.

147. **Alsocomus puniceus.**—The Purple Wood-Pigeon : Common at Bamiaburu but less so at Goilkera. May be seen feeding with the Blue Rock-Pigeons.

148. **Streptopelia chinensis.**—The Spotted Dove : A very common resident. Absent from Bamiaburu.

149. **Streptopelia decaocto.**—The Ring-Dove : Frequent at Chaibassa and Goilkera in cultivation.

150. **Oenopopelia tranquebarica.**—The Red Turtle-Dove; Resident and common at Barkhela and Luia. Occasionally seen feeding on the Forest Roads as well.

ORDER GALLINAE.

Family *Phasianidae.*

151. **Pavo cristatus.**—The Pea-Fowl. Common and resident throughout the forested areas.

152. **Gallus gallus.**—The Red Jungle-Fowl : Common throughout the Forests.

153. Gallus sonneratii.—The Grey Jungle-Fowl : Seen only twice in the winter at Bamiaburu, both Cocks. Status not well defined.

154. Galloperdix spadicea.—The Red Spur-Fowl. Only observed on the road to Khajuria near Goilkera.

155. Galloperdix lunulata.—The Painted Spur-Fowl : Seen in the forested areas.

156. Perdicula asiatica.—The Jungle Bush-Quail : At Luia and Saitba, where it is resident.

157. Francolinus francolinus :—The Black Partridge : A very common resident throughout the forested areas. More numerous than the Grey Partridge.

158. Francolinus pondicerianus.—The Grey Partridge : Common and resident throughout the forests. Was found breeding in broken country very near to the Forest Rest House at Goilkera.

ORDER GRALLAE.

Family *Rallidae.*

159. Fulica atra.—The Coot : On Baihatu lake near Chaibassa.

ORDER CHARADRIIFORMES.

Family *Oedicnemidae.*

160. Burhinus oedicnemus.—The Stone-Plover : Small parties on rocky outcrops in the compound of the residence of the D.F.O., Kolhan, at Chaibassa in winter only.

Family *Glareolidae.*

161. Cursorius coromandelicus.—The Indian Courser : Rare. Occasionally seen on the roads near Luia and Patung.

Family *Sternidae.*

162. **Sterna aurantia.**—The River-Tern : Only two birds seen on the Karo river near Rajabassa in summer.

Family *Charadriidae.*

163. **Charadrius dubius.**—The Little Ringed Plover : Seen at Chaibassa and Luia. Uncommon.

164. **Lobivanellus indicus.**—The Red-Wattled Lapwing : Common and resident in the open fields of the Deo Valley at Patung and in similar well watered areas between Jhilruan and Raghunathpur. Also at Posoita.

165. **Lobipluvia malabarica.**—The Yellow-Wattled Lapwing : Less common than the Red-Wattled one, and only observed at Saitba and Luia.

Family *Scolopacidae.*

166. **Capella gallinago.**—The Common, or Fantail Snipe : On a jheel in open fields on the Chaibassa-Kathbiri road, much east of the forest block.

ORDER STEGANOPODES.

Family *Phalacrocoracidae.*

167. **Phalacrocorax carbo.**—The Large Cormorant : On the Deo river and near Saitba.

168. **Phalacrocorax niger.**—The Little Cormorant : Common and resident throughout the Division near water.

ORDER HERODIONES.

Family *Ciconiidae.*

169. **Dissoura episcopa.**—The White-necked Stork : Common and resident throughout the Division.

Family *Ardeidae.*

170. **Egretta alba.**—The Large Egret : Seen at Saitba, Barkhela and Luia always in fields.

171. **Egretta garzetta.**—The Little Egret : Fairly common and resident.

172. **Bubulcus ibis.**—The Cattle Egret : Common and resident throughout the Division except at Bamiaburu where only a few were seen. As many of these egrets did not assume the nuptial plumage as did during the breeding season. Most numerous of all the egrets.

173. **Ardeola grayii.**—The Pond Heron : Common and resident everywhere.

174. **Butorides striatus.**—The Little Green Heron : common near water.

175. **Nycticorax nycticorax.**—The Night Heron : A very common resident.

ORDER ANSERES.

Family Anatidae.

176. **Aythya rufa.**—The White-eyed Pochard : A few birds seen at Barkhela on a large tank.

ASSOCIATIONS.

The following Associations were observed :

I. Bamiaburu : (*i*) Immediately west of the Forest Rest House :—Grey Tits, Small Minivets, Jungle Babblers, Black Drongoes, Crimson-breasted Barbets, Tickell's Flower Peckers, Black-headed Orioles, White-bellied Drongoes, Green Bee-eaters, Yellow-eyed Babblers and Yellow-cheeked Tits. (*ii*) Swimming Pool :—Small Minivets, Red Whiskered Bulbuls, Tree Pies, Tickell's Flower Peckers, Black-headed Cuckoo-Shrikes and Purple Sunbirds. (*iii*) Fish Pond :—Grey Tits, Yellow-cheeked Tits, Black Drongoes and Golden

Orioles. (*iv*) Preservation Plot and Experimental Plot on Road to Jhilruan :—Tickell's Flower Peckers, Rufous-backed Shrikes and Black Drongoes.

(Period : 12th November, 1947 to 22nd November, 1947).

II. Goilkera : (*i*) About the Forest Rest House :—Jerdon's Chloropsis, Grey Shrikes, Black Drongoes, Tickell's Flower Peckers, Red-vented Bulbuls, Small Minivets, Golden Orioles, Green Bee-eaters, Crimson-breasted Barbets, Indian Rollers, Tree-Pies, Blue-tailed Bee-eaters, Chestnut-bellied, Nuthatches, Red-whiskered Bulbuls and Ashy Wren-Warblers. (*ii*) Kantora :— Ashy Wren-Warblers, Small Minivets, Chestnut-bellied Nuthatches, Golden-backed Woodpeckers.

(Period : 22nd November, 1947 to 30th November, 1947).

III. Chaibassa : (*i*) Bungalow Compound :—Grey Shrikes, Bay-backed Shrikes, Pied and Common Mynas, House Crows and Pariah Kites. (*ii*) In cultivation west of Compound :— Common Mynas, Pond Herons and Cattle Egrets.

(Period : 30th November, 1947 to 10th December, 1947).

IV. Patung : (*i*) Round about the Forest Rest House :— Black-headed and Golden Orioles, Jerdon's Chloropsis, Scarlet Minivets and White-cheeked Bulbuls. (*ii*) On evergreen flora near the *Patung gara* : Red-vented Bulbuls, Eastern Grey and Pied Wagtails, Spotted, Red, White-backed and White-throated Munias.

(Period : 11th December, 1947 to 20th December, 1947).

V. Saitba : (*i*) Forest Rest House Compound :—Red-vented Bulbuls, Tickell's Flower Peckers and House Sparrows. (*ii*) Cultivation west of Rest House :—Gold-fronted Chloropsis, Black-headed Orioles and Jerdon's Chloropsis. (*iii*) In Village Forest east of Rest House :—Tickell's Flower Peckers, Indian Wren-Warblers, Common Ioras and Small Minivets.

(Period : 22nd January, 1948 to 29th January, 1948).

NOTES

(*i*) The Large Indian Parakeets and both the Common and Pied Mynas at Bamiaburu and Goilkera used to fly about in their own flocks and feed without much association with other species. Parakeets used to spend the night on a tall tree on the Road to Sonua, (Swimming Pool locality), at Bamiaburu, while Pied Mynas used to spend the night on a tall dead tree west of the Forest Rest House, and on the hills by Huisipi Village. They used to fly towards the plains for feeding. At Goilkera several trees on the road to Kantora Village were used by Common Mynas for spending the night.

(*ii*) At Chaibassa there were groups of Ashy Wren-Warblers, Magpie Robins and Palm Swifts that used to fly about in their own groups without any association with other birds. There was also another group of flocks of the Green and Blue-tailed Bee-eaters which remained isolated and were not found in the company of other birds.

(*iii*) At Patung the following were noticed in their own flocks :—Grackles, Large Indian Parakeets, Crow-Pheasants, Common Mynas. Eastern Grey Wagtails were in flocks very near to the Forest Rest House.

(*iv*) At Saitba Common Mynas, Spotted Doves and Rock Pigeons formed flocks of their own.

The following average number of birds were observed daily at the places mentioned below :—

1. Patung :— 200 to 300, some days up to 700.
2. Goilkera :— About 150.
3. Bamiaburu :— About 300.
4. Saitba :— About 100.
5. Chaibassa :— About 70.

(*Concluded*).

SANCTUARIES IN BIHAR

By

Jamal Ara

In 1946 by the enactment of the Bihar Private Forests Act the State Government acquired control over some 8,000 square miles of privately owned forests but so far not a single sanctuary has been created in those areas. Those are the areas which have suffered most from a lack of shooting control as the owners and their friends used to massacre game particularly tiger and deer by shooting at night with the help of spot-lights from automobiles. All the existing sanctuaries in Bihar are in the State-owned forests and have been in existence from a minimum of five years to a maximum of over twenty years. At the moment there are five sanctuaries, three in the district of Singhbhum, and one each in the districts of Palamau and Hazaribagh.

The oldest sanctuary is the Bamiaburu one, located in the Kolhan Forest Division of the Singhbhum District. It is situated at a distance of 10 miles from the Sonua railway station of the main Calcutta-Nagpur line of the Eastern Railway. This station is at a distance of just over 200 miles from Calcutta, and the sanctuary is connected to it by a fair weather road. This sanctuary was created in 1932 and covers an area of about 50 square miles. The crop is mostly Sal, (*Shorea robusta* Gaertn.), poor in places with evergreen patches along streams. It tends to become very dry in the hot weather and in the very hot summer of 1948 there was an acute shortage of water as the only two streams running through it which are normally perennial dried up that year. A fish-pond and a swimming pool have been built by the Forest Department and generally provide water throughout the year. The sanctuary is set amidst sylvan surroundings and from the Forest Rest House which is in the heart of the sanctuary a lovely view is obtained. There is no habitation for several miles around and, apart from the few buildings of the Forest Department there is nothing to disturb the perfect peace that reigns here.

In this sanctuary deer are most plentiful and any night motoring up from Sonua one can come across Sambhar on the road. Tigers have recently begun multiplying and have spread out into adjoining areas where none could be seen formerly. The animal that appears to have benefited the most is the Sambhar, though other deer and Carnivora also occur.

In order that this sanctuary may be of real benefit it is necessary first of all to improve the water supply. For this the swimming pool has to be deepened and its exit controlled by a small sluice gate so that during the dry period the maximum amount of water can be impounded. The fish pond has to be desilted every year so that its depth is sufficient to allow water to remain in it all the year round.

Another scenically beautiful sanctuary is the Sasangdabaru one in the Saranda Division of the Singhbhum district, created in 1936. It is rather small, having an area of only about 36 square miles. It is at an elevation of around 2,000 feet and comprises some of the best Sal forests to be found in India. It is very well watered with a large number of perennial streams and many of the valleys are so moist as to carry evergreen forests. A number of trees like *Michelia champaca* and *Xylia xylocarpa* occur here which are not to be found growing naturally elsewhere in the State. It is real wild country and with proper management can become one of the best sanctuaries in the country. It contains a very fair selection of all kinds of animals and on occasions rare specimens like Black Panthers have been seen. It is also very rich in bird life. The sanctuary has been of great benefit to Elephants and to-day they have multiplied to such an extent that the Forest Department have now to consider means of reducing their numbers. The animals here are comparatively free and it is not unusual to find Sambhar grazing in the compound of the Forest Rest House at Kumdi situated at one end of the sanctuary.

This sanctuary is rather inaccessible, only one fair weather road fringes it and it is 20 miles from the nearest rail-head. The freedom of the animals is probably due to this inaccessibility. However, the area of the sanctuary is too small and as

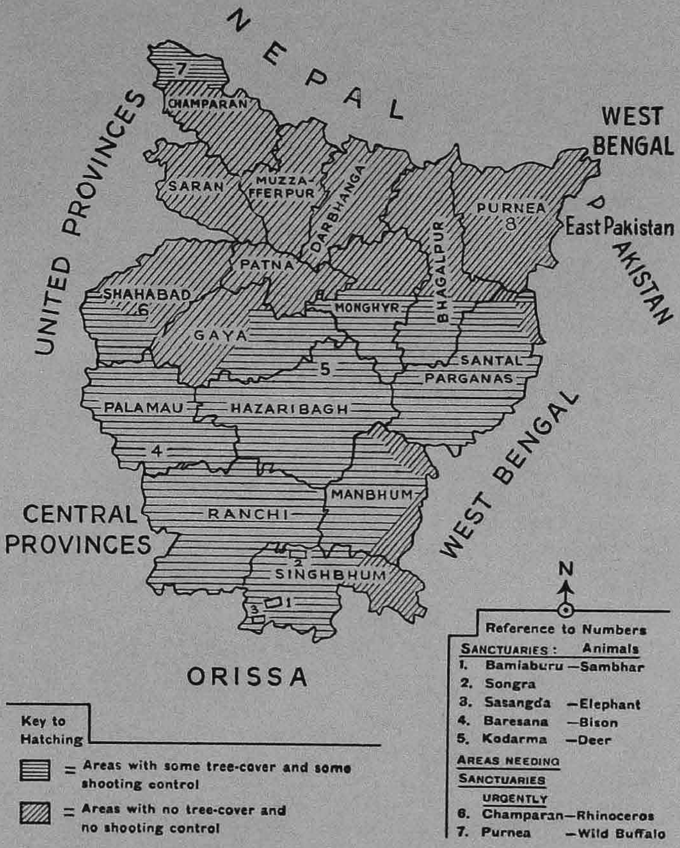
there are dense forests all round it, it would be a much better idea if the area of the sanctuary is increased to cover some 100 square miles or so.

The other sanctuary in the Singhbhum district is the Songra in the Porahat Division. It has an area of about 56 square miles and has an average elevation of 1,200 to 1,800 feet. The crop is mostly thin Sal with very few evergreen patches. The water supply is very poor though there is one fairly big perennial stream running through it. It is one of the worst situated sanctuaries in the State because the main Ranchi-Tatanagar highway runs through it and carries a fairly heavy traffic. Due to this it is very prone to poaching and the sanctuary itself is of doubtful value. It was created in 1935.

In the district of Palamau the sanctuary comprises the Baresand Block and was created in 1946. Prior to that shooting was allowed but no beating or driving of game was permitted. This sanctuary contains Sal and bamboo and is very open at places looking almost like a parkland. One large stream carrying enough water even in the hot weather flows through it but otherwise the water supply is poor. It becomes very hot and dry during the summer. Even though the sanctuary has been in existence for only some six years it has benefited the Bison. These animals can even be seen on the adjoining Neterhat plateau though they are still very shy. It is too early yet to say if the deer and Carnivora have benefited. It covers an area of 50 square miles and has an average elevation of 1,000 to 1,500 feet.

The biggest sanctuary in the State covers the Reserved forests of Kodarma in Hazaribagh district. It has an area of 80 square miles and an average elevation of 1,000 to 1,500 feet. It was constituted in 1947.

It is rather unfortunate that the best Mica deposits should coincide with the Reserved forests and as a result the sanctuary is honey-combed with Mica mines and labour camps. On top of this, the water supply is poor.



BIHAR

Showing

WILD LIFE RESERVES

Scale 1"=About 90 Miles

Courtesy : Forest Department, Bihar. *Photo : W. D. M. Warren, I. F. S.*

An Evergeen Patch in Bamiaburu Sanctuary.

This sanctuary has also the main Patna-Ranchi road running through it and the traffic is heavy. The intention behind the creation of this sanctuary is quite different from that of the others. The others have been created to provide centres where animals can breed undisturbed and then spread out into the adjoining areas. But for Kodarma the intention merely is to save whatever animals are left there. Owing to the Mica mines and the main road poaching was so rampant in the area that any control appeared impossible. Therefore, the sanctuary was created and as a result the control is tighter and the poaching is less pronounced than what it was before. But the situation admits of no complacency and much stricter supervision is necessary. To sum up there are five sanctuaries in the State covering an area of 272 square miles out of a total forest area of over 10,000 square miles. Thus the sanctuaries are only some 2.5% of the total forest area and only 0.4% of the total area of the State. These figures reveal how hopelessly inadequate are the sanctuaries for the purpose for which they are meant.

As far as limited improvement of game prospects is concerned these sanctuaries are serving their purpose, but it has to be borne in mind that apart from the creation of the sanctuaries no special measures have been taken to ensure that wild life is really preserved and augmented by them. In addition there are several other factors which militate against these sanctuaries functioning efficiently and serving the purpose for which they have been created. The first and foremost factor is that the general lowering of the standards of honesty that has become so common over the country has corrupted the Forest Department to an extent that was unimaginable in pre-war days. To-day there is no forest rule that cannot be infringed with impunity provided the person infringing it is prepared to pay for it, the amount being commensurate with the magnitude of the offence involved. One of the commonest these days is the desecration of sanctuaries, particularly at night from automobiles. Deer and tigers are the worst sufferers at the hands of poachers. All they have to do is to be well in

with the subordinate staff of the area; and in exceptional cases with the Forest Officer as well, and then go and shoot in the sanctuaries with impunity at will. Such poachers far from being ashamed very often boast publicly of their "exploits".

The next kind is the person who has influence either by virtue of his position or friendships. While such persons generally leave sanctuaries alone, they do not hesitate at shooting from cars. Amongst them must also be included the army of exempted persons who are not bound to take out a licence before shooting in a forest. This class includes some of the worst poachers known to the State, who abuse their privileged positions and behind this screen commit their dark deeds.

Lastly is the lacuna in the shooting rules which permits District Officers to declare animals as dangerous and issue licences for their destruction; as also the provision that any animal may be shot in self defence. Under cover of these two tigers are the worst sufferers, many being shot on the flimsy excuse of being cattle lifters when they are far from being so, whilst under the second clause animals running away from humans are shot in self defence!

On the whole, it can be said that the shooting rules are excellent as far as they go; but they have to be enforced, and therein lies the rub. All the improvement that can be suggested in the rules themselves is that there should be no exempted persons, carrying of arms inside the sanctuaries should be forbidden, the Forest Officer alone should have powers to declare any animal dangerous; and that all shooting licences should limit the numbers of winged and ground game that can be shot. This last is never done and shooting of such game is permitted to an unlimited extent. This coupled with poaching has resulted in the Red Spur-Fowl (*Galloperdix spadicea*) being practically wiped out from Kodarma. The writer remembers seeing these birds in 1948 even, in the compound of the Forest Rest House at Kodarma which is at the fringe of the forests, but could not see any in the forests on a subsequent visit in 1950! So rapid and apace had been the destruction.

Courtsey : Forest Department, Bihar. *Photo : W. D. M. Warren, I. F. S.*

A View of Sasangdaburu Sanctuary.

Regarding the sanctuaries themselves, more of them are badly needed. At the moment they are all concentrated in the Reserved Forests of Chota-Nagpur. None exists in any Private Protected Forest, *i.e.*, in those forests that have been taken over under the provisions of the Bihar Private Forests Act, neither is there any sanctuary in the Santhal Parganas which contains some of the oldest State-owned forests. Again, these sanctuaries cater only for animals and such birds as occur in them. No protection is afforded to birds or animals occurring outside the forests, and they stand in sore need of protection. Migratory birds particularly Ducks, Teals and Cranes are slaughtered by the thousands every year. Their winter homes are the jheels and other large stretches of water, mainly in North Bihar, and over them practically no shooting control exists. It is essential that some large jheels and chaurs in North Bihar be declared sanctuaries for the protection of our winter visitors. Similarly, the Rhinoceros and Wild Buffalo occur as strays in the remnants of the forests left in the Champaran and Purnea districts. It is necessary that these areas be converted into sanctuaries. The probability is that these animals have become extinct as far as Bihar is concerned. but occasional ones do wander in from the adjoining Nepal forests, and if these areas are made into sanctuaries, there is every chance that they will stay on to breed and multiply. Another good place for a sanctuary will be the forested hills surrounding the lake at Kharagpur in the Monghyr district, and this will also help in the protection of migratory and hill birds. Also it might be a good idea to convert each Forest Division in turn into a sanctuary, say for ten years or so, to give it a chance of rehabilitating itself, before throwing it open to shooting again. As a first choice the Divisions that have been badly shot over like Palamau, Monghyr and Hazaribagh may be so closed. This will give them a chance of recovering from past ravages.

A word about the management of the sanctuaries. So far neither is any staff employed exclusively for wild life protection nor are any special works of improvement to benefit wild life undertaken. To start with, one Forester and two Forest

Guards may be employed solely to guard and protect each sanctuary. The normal Divisional staff is too heavily pressed with Silvicultural duties and wild life protection usually forms a very negligible portion of their duties. This special staff could also be employed to take periodical censuses of the animals in the sanctuary, as also to report any points of interest that they observe. The Forester could submit quarterly reports to the Forest Officer about the state of affairs in his sanctuary, mentioning particularly whether animals and birds are responding to the protection or not. Such staff, however, will have to be given special training about their duties, particularly in the identification of important animals and birds. Such instruction could be given to them at the existing Forester's and Forest Guard's schools by the officers of the department, one of whom could be deputed by turns for this duty. Of course, the ideal would be to have a Game Department devoted exclusively to this work, but failing that, the above could be tried out to see how far it succeeded.

Secondly, steps specially for ameliorating conditions for wild life will have to be taken. The first pre-requisite is the improvement of water supply in areas where it is called for. Amenities so that people can visit the sanctuaries and see the wild life will also be necessary, so that a general interest is created thereby. A small admission fee could be charged and this would provide additional funds for the purpose. So far very little money has been provided for the sanctuaries, it being barely some Rs. 3,500/- out of a total departmental budget of some 50 lakhs. More money is urgently needed if the beautiful and varied fauna of this State is to be saved from ultimate extinction !

FOSSILS—FROM THE FIELD TO THE MUSEUM GALLERY

By

S. THOMAS SATYAMURTI, M.A., F.Z.S.

Nearly every one has some idea of what fossils are—those mysterious remains of the curious and sometimes almost unimaginable forms of animal and plant life that once

flourished on the face of this earth. Outstanding among them are the well known Dinosaurs, a remarkable group of giant reptiles that dominated the world in the remote geological past. Unfortunately the huge and awe-inspiring skeletons of fossil animals are seldom seen set up for exhibition in any of the Indian Museums mainly because of the immense difficulties involved in collecting, preserving and reconstructing fossil remains. But in several western Museums, notably in the United States, where they have the men, money and material for accomplishing this herculean task, the visitor is baffled and dwarfed in the presence of the overwhelming skeletons of the gigantic Dinosaurs and other monstrous fossil reptiles and mammals which stare at him as he enters the great Palaeontological galleries. One such hall is seen in the accompanying photograph. Where are these fossils found? How are they collected and prepared as exhibits for the Museum? Such are the questions that naturally arise in the mind of an inquiring visitor.

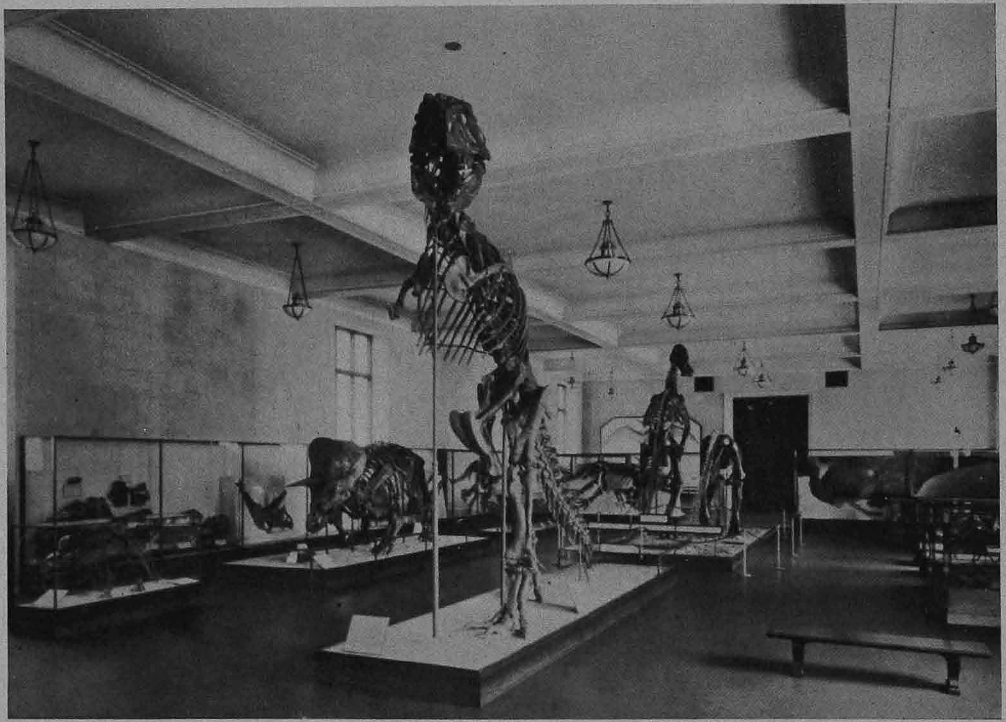
It is a highly interesting story, how these fossils are collected, preserved, transported, mounted and exhibited. At the outset the fossil collector should remember that fossils are concrete remains of past life on earth and that they may exist in various forms: they may be bones, egg shells impregnated with stony material, foot prints, skins or impressions of skins, outlines of the body or bony plate-like armours. The fossil hunter should also know where he should look for fossils. Fossils are generally found in dreary, out of the way places, such as uninhabited deserts, hills and valleys, but as many of the territories which are known to be rich in fossils have already been discovered and mapped, the fossil explorer usually selects one of these known localities where he might reasonably expect to find the fossils he is looking for, and having selected a suitable area, commences a carefully planned excavation to unearth the fossil treasures of the selected site.

Geologists tell us that the sedimentary rocks of the earth are made up of several well defined layers or strata corresponding to the great Geological eras, namely, the Palaeozoic,

Mesozoic, and Cenozoic, each ranging over several millions of years in duration, and since it is an established fact that the Dinosaurs lived during the Mesozoic era, the fossil collector would explore the strata of the Mesozoic age if it is the Dinosaurs that he is looking for. Similarly fossil fishes are found in the early Palaeozoic rocks, while the more advanced mammals predominate in the later Cenozoic beds.

When the work of excavation for fossil collecting is commenced and some rock strata are exposed, the presence of a few fragmentary fossil remains in these strata generally afford a useful introductory clue to the age of the beds that have been exposed; for the beds are dated chiefly on the basis of the type of fossils they contain. And it is only after one has definitely determined the age of the exposed beds and has made sure that they are the required strata that further exploratory work is carried on in those beds systematically. Several successive levels or 'horizons' in the rock strata are exposed and by a process of trial and error the fossil hunter determines the fossil-bearing ones and carefully traces their entire course, looking intently for the precious fossils he has set out to collect.

A keen eye for fossil form and structure, enabling quick recognition of the various forms in which fossils exist, is a great asset to the field Palaeontologist. As mentioned earlier in this account, fossils assume a great variety of forms and it is only by considerable experience that the fossil collector learns to recognise them in the field and interpret them correctly. Fossil collecting entails tremendous powers of endurance and highly strenuous labour, and it becomes necessary for the collector to scramble along the faces of steep cliffs and rocks in his arduous hunt for fossils. Further, the hardships of the poor fossil enthusiast may frequently become almost unbearable when Nature tyrannises over him with the scorching heat of the sun, sudden gusts of rain or dust storms and the menace of flies and hornets. But with all this the fossil hunter still loves his field trip.



A Dinosaur Gallery in the American Museum of Natural History. Note the Imposing Skeleton of *Tyrannosaurus*, the Tyrant King of the Dinosaurs in the Centre.

Sooner or later the fossil collector will be delighted by the discovery of traces of fossils as he proceeds with his exploration. A few pieces of bone and perhaps some teeth generally show up, to start with. That is a welcome sign, for it is frequently an infallible prelude to the discovery of an entire skeleton somewhere in the vicinity, and once such a find has been definitely confirmed, the explorer establishes for himself a temporary workshop on the spot and starts intensive shovelling and picking. Generally tons and tons of rocky matter or 'overburden' is found piled on top of the fossils and all this has to be dug up and removed. But this hard work is often amply rewarded by the exposure of a fine, entire fossil skeleton, or even a series of skeletons which may turn out to be a valuable treasure scientifically.

The entire fossil has to be now exposed and released from the substratum. It is a laborious task and involves careful uncovering of the bones with pick, hammer, awl and brush. Every bone and tooth that is exposed should be carefully shellacked and wrapped with tissue paper to prevent it from crumbling to powder. The skeleton is then removed, either bone by bone or in blocks, containing several bones adhering together. In order that the blocks of bones thus removed may not break into pieces during transit, they are always covered with strips of burlap or jute cloth dipped in liquid plaster of paris, so that when these plastered strips set and harden, they form a rigid, efficient, protective outer coat rendering the fossils immobile and unbreakable, much in the same way as a fractured arm or leg is immobilised with plaster.

Having treated the fossils thus, the entire lot of the collections is now packed with straw in strong wooden boxes and transported to the nearest port or railroad station from which they are consigned to the Museum which undertook the expedition. When one considers the fact that a single bone of some of the Dinosaurs weighs several hundreds of pounds, and that fossil-bearing localities are frequently situated in some of the most desolate parts of the earth with scarcely any facilities of

transport, the extremely difficult nature of the work can be readily imagined. It is for this reason that only the largest and most well equipped institutions are able to undertake such fossil-collecting expeditions—a classical example being the great Central Asiatic Expedition of the American Museum of Natural History, which transformed the arid wastes of the Mongolian desert into a veritable mine of fossil wealth.

When the collections arrive at the Museum Laboratory, they are unpacked and the plaster reinforcements carefully removed. The fossils are then prepared for study or for exhibition in the galleries, as the case may be, and this really is the most difficult and tedious part of fossil technology, taxing to the utmost the skill and patience of the palaeontologist. Every bone must be freed from the rock matrix to which it is adhering, and strengthened with shellac. Generally the long and heavy bones are drilled through, and iron rods are inserted into them to serve as supports. Very often it is a regular jig-saw puzzle—this job of putting the pieces of bones together in their correct position, and it is not unusual for the fossil technician to do a good deal of "filling-in-the-blanks" by making up the missing parts with plaster and colouring it to match the real bones.

After the fossil has been fully prepared it is examined scientifically, compared with other fossils, and identified. If it turns out to be a new form, it is written up for publication, and the paper is illustrated by photographs and accurate drawings of the fossil made by trained scientific artists. Usually the general bulk of the fossil collections of the larger Museums are stored as study collections for the sole use of students and research workers, and it is only the choicest, most spectacular and completely reconstructed fossils that are placed on exhibition in the public galleries of the Museum.

Mounting a huge fossil, say a Dinosaur skeleton, for exhibition is not an easy task. An elaborate scaffolding has to be erected, and long iron rods bent to conform to the shape of the

larger bones are provided to serve as a substantial framework on which the skeleton can safely rest. The secientist and the technician together work on the skeleton for weeks, or perhaps months together, until at last the skeleton stands perfectly articulated in a posture which is interesting and at the same time anatomically accurate. Very often the smaller fossil skeletons such as those of the fish-like swimming reptiles (*Ichthyosaurus*), or those in which the bones of one side only are in a presentable condition, are mounted firmly in a thick panel of plaster encased in a strong wooden frame, and the surface of the plaster is roughly chiselled out to suggest the texture of the rock matrix in which the fossils were originally found embedded. Such exhibits are known as panel mounts and are a familiar slight in most palaeontological museums.

The fully prepared and mounted fossil exhibit which represents the finished product of the palaeontologist's scientific skill, now seems ready to go into the fossil gallery of the Museum, but the end is not yet in sight. For, a clear descriptive label must be prepared in popular language, and it is also customary to enhance the educative value of the fossil by supplementing it with an attractively painted picture of what the animal would have looked like in life, amidst all the splendour of its contemporaneous vegetation. Such a picture is known as a restoration and comes very near the truth as it is based on deep scientific insight. Sometimes a miniature model of the artist's conception of the original animal may also be exhibited. All these are excellent visual aids enabling the visitor to imagine the fascinating grandeur of the prehistoric monster.

When, finally, the fossil skeleton stands on exhibition in the Museum gallery, accompanied by lucid explanatory labels and colourful restoration paintings and models, the fossil explorer, preparator, scientist and artist who toiled at it will deserve the warmest congratulations of every admirer on their superb achievement.

INAUGURAL SESSION OF THE CENTRAL BOARD FOR WILD LIFE, INDIA.

The recently (4th April, 1952) constituted Central Board for Wild Life held its inaugural session at Mysore from November 25th to December 1st, 1952, under the chairmanship of its chairman the Maharaja and Rajpramukh of Mysore.

The members of the Board, in addition to the chairman, comprise the following :—Maharaj Dharmakumarsinhji of Bhavnagar and the Inspector-General of Forests, Vice-chairmen, a representative each of the Geological, Zoological and Botanical Surveys of India, the National Institute of Sciences, the Ministries of Natural Resources and Scientific Research and of Transport, State Forest Departments, Zoological Gardens, Fisheries Development and the Bombay Natural History Society. An officer of the Ministry of Food and Agriculture is the Secretary. The following unofficial members belong to the Board :—E. P. Gee, Raja of Sandur, R. C. Morris and Lt.-Col. R. W. Barton.

After an inspiring and educative inaugural address by the Chairman, the Maharaja of Mysore, the members of the Board immediately appointed technical Sub-Committees to deal with the various subjects awaiting their attention. Sub-Committee A dealt with national parks and sanctuaries; zoological parks and gardens ; protected animals and any other cognate matter. Sub-Committee B dealt with requests for representation on the Board, framing of Bye-laws and modifications in the constitution of the Board and the setting up of States Boards. Sub-Committee C dealt with wild life legislation at the Centre and States ; other (non-statutory) measures for the protection of wild life ; and publicity, education and liaison. Sub-Committee D dealt with trading in trophies, skins, etc., and export and import of wild animals.

The main resolutions of the Board, passed at its plenary session on November 30th, are briefly outlined below :—

The Board decided to change its name as the "Indian Board for Wild Life" so as to specify its precise territorial limits for international purposes.

Another resolution urged that although provision had been made in the Indian Constitution for the protection of wild life, the Board sought a declaration of it by Parliament through law as an institution of national importance as envisaged in the Union list of the Seventh Schedule to the Constitution, more specially as the proper exercise of the Board's functions involved recourse to actions under one or more of the entries in the Union and Concurrent legislative lists.

The reasons put forth in support of the above resolution were that India's heritage of wild life was fast becoming a vanishing asset in respect of the country's rare and notable animals such as lion, rhinoceros, cheetah, tragopan, etc., and that the preservation of the fauna of India and the prevention of the extinction of any species is a matter of great national importance.

By another resolution, the Board urged the preservation of nature in its unspoiled state and to maintain the equilibrium between the plant and animal kingdoms and among animals themselves. For accomplishing the above purpose, the resolution emphasised the need for the creation of national parks in conformity with the general objectives laid down by the International Union for Protection of Nature, creation of wild life sanctuaries, imposition of restrictions on the issue of shooting permits, prohibition of shooting particular species, appointment of honorary wild life officers from among the public for assisting the official machinery, and setting up and administration of zoological parks and gardens in the States on the model of the Alipore Zoo in Calcutta. Further, it laid stress on the maintenance of zoos at a high standard of efficiency. The

resolution also declared the following species of animals and birds as protected :—

1. Indian Lion.
2. Snow Leopard.
3. Clouded Leopard.
4. Cheetah.
5. Rhinoceros (all species).
6. The Indian Wild Ass.
7. Kashmir Stag.
8. Musk Deer.
9. Brow-antlered Deer.
10. Pigmy Hog.
11. Great Indian Bustard.
12. Pink-headed Duck.
13. White-winged Wood Duck.

In view of the fact that the Indian Lion, which, not long ago, was distributed throughout North-west India, has now receded to the confines of the Gir Forest in Kathiawar Peninsula, and that it is an animal of national importance requiring rigorous protection, the Sourashtra Government were requested to associate themselves with the Central Board in the management of lions of the Gir Forest with a view to ensuring sufficient protection to this species which was becoming extinct.

Another resolution recommended the setting up of the necessary administrative machinery for carrying out the day-to-day administration of the Board and wild life problems in the proper fulfilment of the aims and objects of the Board and setting up of State Wild Life Boards, appointment of honorary regional secretaries and an executive committee consisting of a non-official vice-chairman, with powers to carry on the day-to-day business of the Board and to take action on its behalf while the Board is not in session.

It was also resolved that non-statutory measures be taken for the prohibition of indiscriminate use of guns licenced for crop protection for the slaughter of wild animals, creation of buffer belts round sanctuaries where shooting of animals was to be prohibited, systematic and periodical inoculation of domestic cattle in the neighbourhood of all national parks, reserves and sanctuaries against cattle-borne diseases. Further, the resolution urged adequate publicity materials be issued both by the State and Central Publicity Departments in close collaboration with the Forest, Agriculture, Horticulture, Scientific Research, Transportation (Tourists) and Information and Broadcasting Departments.

By another resolution it was urged that export of trophies be prohibited except under a certificate of ownership issued by a prescribed authority of the Central or State Governments. It also sought to prohibit netting of birds and animals during close periods and their sale, and also sale of venison and parts of wild animals. Measures for the effective prevention of cruelty to birds and animals in captivity and transit were also urged.

Regarding the export and import of living animals, the Board's resolution urged fixation of annual limits for purposes of zoos, circuses and scientific institutions. The Board also decided upon holding a symposium early to assist in the formation of policies in respect of national parks and sanctuaries for maintaining wild life exhibits in zoos and management of sanctuaries. Finally, the Board conveyed its thanks to the Mysore Rajpramukh and his Government for affording all facilities for holding the Board's meeting in Mysore City.

At the concluding session of the Central Board for Wild Life, the Chairman spotlighted the Board's recommendation to rehabilitate the Indian Lion, which was so intimately connected with the cultural life of India. He also drew the attention of the public to the Board's recommendation on the creation of zoological parks, as distinct from zoological gardens, which could be useful in rescuing and multiplying rare and

vanishing species, as well as providing entertainment and an opportunity to study wild life. He also referred to the Board's recommendation for the creation of sacrosanct areas within wild life sanctuaries, areas which could be called "Abhayaranya," or forests where animals could roam about without fear of man, and in them plant life would also be fully protected.

After the Chief Minister of Mysore had spoken, the Union Minister for Agriculture, Dr. Punjabrai Deshmukh, suitably wound up the proceedings, saying that public conscience must be aroused against the insensate killing of our beautiful birds and animals which cannot defend themselves against modern weapons of destruction and the insatiable greed of mankind. He advocated the creation of an atmosphere which will convert a poacher into a preacher for the preservation of wild life.

Five three-month-old tiger cubs were invited and brought to the concluding session, and were referred to as the dumb representatives of the denizens of the forests at the deliberations. In the radio broadcast of the proceedings, these cubs could be heared growling their appreciation.

—E. P. GEE.

NATIONAL COMMITTEE FOR INDIA FOR BIRD PRESERVATION.

The inaugural meeting of the above Committee was held at the Indian Museum, Calcutta, on November 24th and 25th, 1952. The following members were present :—Mr. Salim Ali (Chairman), Mr. H. G. Alexander, Dr. J. L. Bhaduri, Dr. B. Biswas, Dr. B. S. Chauhan, Dr. H. R. Mehra, Dr. M. L. Roonwal.

The following members, who are also members of the Central Board for Wild Life which was due to meet in Mysore on the same dates, could not be present :—Mr. E. P. Gee, Dr. S. L. Hora, Dr. S. C. Law. These three members, however, were present at an informal meeting held in Calcutta on November 23rd. when all the above members were present, with the exception of one member.

Dr. B. Biswas was elected to act as Honorary Secretary and the headquarters of the Committee will be C/o. Bombay Natural History Society, 114, Apollo Street, Bombay 1.

Among the recommendations of the Committee were the establishment of the following bird sanctuaries :—

1. Keoladeo Ghanam Bharatpur, Rajasthan. Area—7000 acres. For protection of water birds such as storks, herons, ibises, spoonbills, etc.

2. Vedan Thangal, near Madras (Chingleput District). Area—74 acres. For protection for water birds as above.

3. The flamingo breeding ground of the Great Rann of Kutch, Kutch.

Recommendations were also drawn up in regard to the export of plumage, cruelty to live birds, wanton slaughter of birds (except vermin).

Sub-Committees were formed to deal with Finance, Sanctuaries, Protection of individual species, Plumage and wild bird export, and Education and publicity.

—E. P. GEE.

A CONTRIBUTION TO THE ORNITHOLOGY OF THE SUNDERBANS

By

S. C. LAW

The present paper is mainly the outcome of a short visit that the writer, thanks to the kindness of Sri S. N. Mitra, the then D.F.O., Khulna, was able to pay to the Sunderbans lying in the district of Khulna during August, 1944.

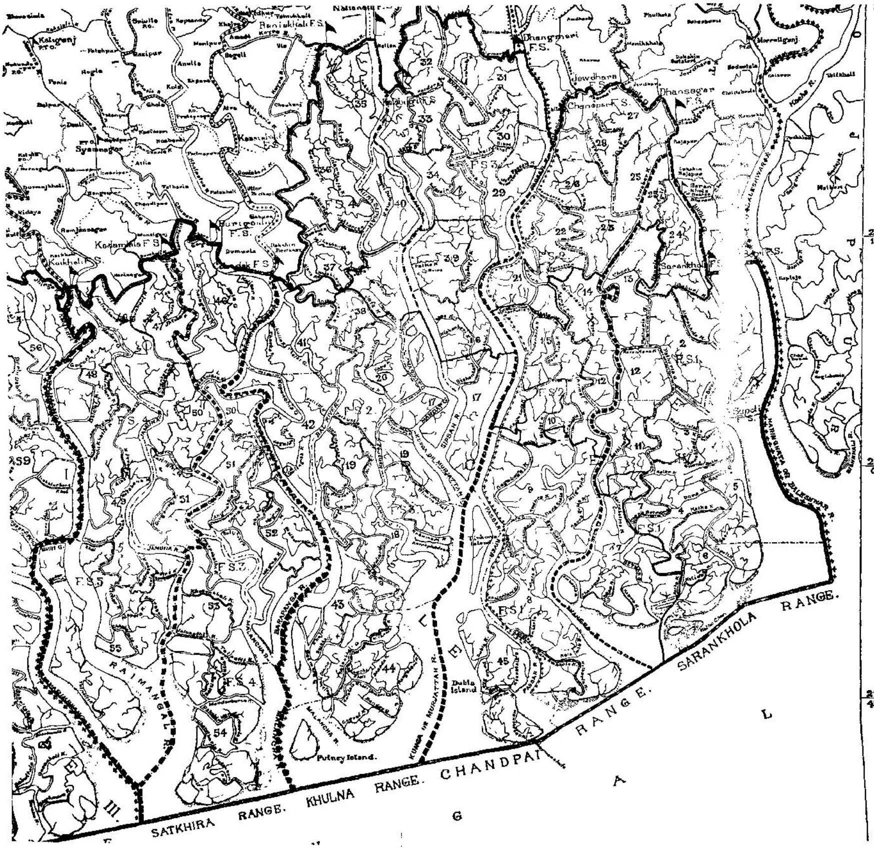
This opportunity presenting itself when the entire region was in undivided Bengal during pre-Independence days,

and all facilities being placed ungrudgingly at my disposal together with the D.F.O's company, I welcomed it gladly and with great eagerness.

In early January, 1946, while undertaking a trip by steamer from Calcutta to Narayanganj I had another opportunity offered to me by courtesy of Mr. R. N. Roy of bird-watching in some outlying parts of the Sunderbans not covered by the previous trip.

Physiography.—The region known as the Sunderbans forms the southern part of the Gangetic delta between the rivers Hughli on the west and Meghna on the east. It consists of three distinct sections, forming west to east the southern portions of the three districts of what was undivided Bengal, viz., the 24-Perganas, Khulna and Barisal.

The country covered by this trip forms part of the central section—lying roughly between 21°38′ and 22°30′ north latitude and between 89° and 89°58′ east longitude—occupied generally by extensive forests, the major portion of which is reserved forest. Its physical features, nevertheless, are diversified. Northwards its appearance nearer the town of Khula is that of a deltaic plain, flat and low, the surface being slightly raised above flood level. The river banks are invariably high, along which cluster the villages and habitations, surrounded by clumps and groves of fruit trees, bamboos and palms. The lands, not unoften given to cultivation, generally slope down from the river banks and are low-lying and swampy and unfit for habitation. *Bils* or marshes with stretches of reed and rush are found in abundance, and where these do not dry up at any time there are extensive areas without a vestige of cultivation. Southwards, nearly forty miles from the town, commences an unbroken stretch of forest extending right down to the Bay of Bengal, intersected by large rivers and estuaries with innumerable smaller channels—a veritable maze of waterways enclosing a large number of islands of various shapes and sizes. This region of morasses and swampy islands, subjected to the perpetual influence of the tides, is clothed with dense, evergreen



MAP OF SUNDERBANS, CENTRAL SECTION

flora, typical of the Sunderban swamp forest. The predominant species is *Sundri* (*Heritiera minor* Roxb.)—a circumstance to which the region owes its name of Sunderbans. Associated with *Sundri* are several characteristic species, notably *Amur* (*Amoora cucullata* Roxb.), *Pussur* and *Dhundol* (two species of *Carapa*) and *Baen* (*Avicennia*), while the river banks are fringed with various species, the most notable being the *Keora* (*Sonneratia apetala* Ham.). Along the banks too some climbing species are in evidence. Further south, nearer the sea, one comes across patches of mangroves, where species other than mangrove are not uncommon. The sea face is not without its distinctive features noticeable in the sandy areas where occur the *Savannah* and certain other species, *e.g.*, *Eugenia*, *Erythrina*, etc., which are not found in the swamp forest. Clearings of any great extent, except what are confined to the northern border of the forests, are hardly noticeable.

The soil of this region of interlacing rivers and creeks, mainly forest-clad, is of recent geological formation—characteristic of the alluvial delta. The entire surface of the soil, during the rains and when the rivers are full, is practically under water at every high tide. At low water during the period of my visit I have found that the whole surface is a sheet of adhesive mud interspersed with shallow pools of standing water. Geologically, this mud is composed of a rather tenacious loam, mixed with a certain proportion of fine sand. More often than not it is of a bluish grey tint, evidently due to the presence of much humus, the surface having a thin coating of river slime. Near and at the sea face this mud appears even under the low tide-level.

The heavy flow of water in the larger channels that marks the rainy season frequently causes erosion of the banks, against which a current sets. Banks are thus at times washed bodily away. Sometimes it is noticed that the root system of the riparian vegetation holds the bank in position, notwithstanding the current undermining it. Where such erosion of a bank takes place, not infrequently there is a coincident and compensating accretion of shelving muddy bank on the opposite and

convex side of the river-reach. This phenomenon of the formation of new land, facilitating an ultimate extension of the forest over it, is a characteristic feature of the Sunderban country. The different possible modes of extensions of the forest by the dispersal and distribution of Sunderban flora as referred to by Prain (1903) deserve mention, viz., (1) human agency, by which the introduction may have been intentional or inadvertent; (2) bird agency (either water bird or fruit-eating bird); (3) wind agency; (4) introduced by river and (5) introduced by sea.

Ecological conditions.—From the ecological standpoint this entire region may be divided into the following zones :

(1) The alluvial rice plain to the north where the river banks are higher, where tanks can be dug that will retain fresh water, and where only the larger streams are much affected by the tides.

Bird species distributed in this zone are mainly common to Central and South Bengal.

(2) Grass Savannahs, which are noticeable in certain southernmost tracts of the rice plain and on the northern border of No. (3).

The grassy swamps, sedges and bulrushes growing on their margins provide haunts for certain species of *Sylviidae*; a few species of *Ploceidae* sometimes occur.

(3) Swamp forest, strictly speaking a type of evergreen tidal forest covering an intricate system of sea creeks and half-formed islands, which separates itself spontaneously from No. (1). This dense, natural and compact forest is pre-eminently composed of species of flora to be met nowhere else in our area save along the southern coast of Chittagong and to a minor degree in the delta of the Mahanadi (Prain, 1903).

Although to a great extent there is an incursion of the bird species noticeable in (1) and (2), species like *Rhopodytes t. tristis* (Less.), and *Ramphalcyon amauroptera* (Pearson) appear to be partial to the swamp forest.

(4) Abandoned sites, such as are seen in mounds or platforms of higher ground within the swamp forest where there still occur old ruins, evidently vestiges of abandoned occupation and of former settlements. The forest here is interesting as containing some trees, *e.g.*, *Bäel* (*Aegle marmelos Corr.*), *Gâb Diospyros embryopteris* Pers.), etc., not indigenous, but apparently introduced by man.

(5) Sea face. This has its characteristic fence of shrubs and creepers immediately behind the line of low sand-hills that occur along the coast, subjected to the influence of the waves; the type of flora here exist under conditions as to light and soil, very different to what prevail in the swamp forest. The strong storms from the north-west, so prevalent in the Bengal plain from March till May, and the cyclones that occasionally sweep up from the Bay of Bengal at the commencement and close of the south-west monsoon do considerable damage to the flora by overturning the taller trees, which break those that check their fall. The trees are thus markedly affected, having in consequence a gnarled, bent and twisted appearance, mostly bare and devoid of branches.

Ornithologically, the distribution of species like *Sitta frontalis* Swains., *Pericrocotus s. semiruber* appear to be related to the forest of the sea face or those in the immediate neighbourhood.

Climate.—The average rainfall is 65.97 inches; maximum humidity 81 %; mean temperature ranges from 69°.1 to 88°.9 F.

The seasons are substantially the same as in other parts of Lower Bengal. The winter sets in towards the close of November and lasts till the middle of February; at this season there is a prevailing north-west wind with heavy dew at night. From mid-February till the end of March—a period locally regarded as the spring, the wind veers round from the north-west to the south and is often variable. The weather becomes very hot in April and continues to be so till the middle of June, when the monsoon sets in. The rains abate in September, when the heat again becomes trying and the atmosphere steamy.

(To be continued).

Statement of Accounts of the Bengal Natural History Society for the year 1952-53.

RECEIPTS.	Rs.	As.	Ps.	EXPENDITURE.	Rs.	As.	Ps.
Opening Balance	7,627	7	3				
1. Government grant to Museum ...	4,500	0	0	1. Pay of Superior Staff including Fixed T. A. of Curator	6,264	8	0
2. Darjeeling Improvement Fund grant to Museum	3,000	0	0	2. Pay of Inferior Establishment ...	1,239	0	0
3. Darjeeling Municipality grant ...	1,524	0	0	3. Printing charges etc of Journals ...	1,049	0	9
4. His Excellency's discretionary grant	250	0	0	4. Purchase of Specimens	12	0	0
5. Subscription	1,379	12	0	5. Office expenses & miscellaneous including Furniture, etc.	3,361	0	6
6. Donations	342	4	3	6. Subscription to other Societies ...	31	7	0
7. Miscellaneous : Sale proceeds of Journals, Coloured Plates, Christmas cards, etc.	401	8	0	7. Unforeseen charges	590	0	0
				8. Advance to Staff	159	0	0
Total	11,397	8	3	Total ...	12,715	0	3
				Closing Balance ...	6,309	15	3
Grand Total	19,024	15	6	Grand Total ...	19,024	15	6

Sd/- S. Thomas Satyamurti,
CURATOR.

NATURAL HISTORY MUSEUM,
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